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THE TEXAS ACADEMY OF SCIENCE.[1]

BY DR. EVERHART.

FOR some time past there has been a feeling on the part of some of those here present that the time was ripe for the formation of a Scientific Association in this State. This feeling needed but a word to find expression of approval and to inaugurate the movement. This word was spoken a little over a month ago, and immediate steps were taken to bring about the present result. The professors of science, natural and exact, in this university, held an informal meeting in the early part of January and decided to send to various men engaged or interested in scientific work in Texas invitations to meet here on the ninth of January for the purpose of organizing a Scientific Society. These invitations met with a most cordial response from everyone. The meeting was held at the time named and organization perfected.

The plan and scope of the Texas Academy of Science are intended to be somewhat similar to those of the National Academy of Sciences at Washington.

As will be seen in the constitution already adopted, the object of the academy is threefold. In the first place it is intended that an opportunity should be given to the scientists of the State to have personal intercourse with each other, to exchange ideas, and to discuss scientific questions of the day. Were this the only object of the academy, still its organization would be well worth the effort, for by this personal intercourse between men of different or kindred pursuits, and by this interchange of thought, and by the consequent regarding various questions from many different standpoints, men become less rusty in those branches of science other than their own, they become more tolerant of the opinions of others, and are compelled to leave those ruts fostered by isolation and freedom from contradiction. To the teacher especially is this feature of the academy valuable. He, necessarily, has always to speak ex cathedra. In presenting subjects to his classes he is lawyer, judge, and jury. To such a man discussions with his equals are a necessity. It is urged upon the members of this academy, therefore, that they not only contribute to its success by scientific papers, but that they will also further its aims and their own advantage by attendance on the meetings.

The second object of this association is to investigate and report on any subject pertaining to the natural or exact sciences, when called upon by any of the departments of the State government. It is intended that this should always occupy a prominent place among the objects of the academy. Apart from our obligations as citizens of Texas, many, perhaps even the majority of us, are particularly indebted to the State. The furthering of her interests, therefore, is of paramount importance, and the development of her resources will promote not only her welfare, but also the welfare of science. We trust that in the near future this Academy of Science will be legally recognized by the State, and that a union profitable to both will be consummated.

The chief idea, however, in forming this association is the promotion of science, natural and exact. To this end it is contemplated that at all regular meetings of the academy original papers or well-digested reports on scientific topics will be presented and discussed. With the present membership, and with the present status of science in Texas, it can hardly be expected that original memoirs will always be on hand, still if the members of the academy will interest themselves in its aims, there is no reason to doubt that we will have during the course of each year at least a respectable number of valuable contributions to science. Our incentives to this desirable result are our duty to the academy, to Texas, and to science.

The chief aims of this organization are, I repeat, the cultivation and promotion of science. By science I mean true science, the search after truth in nature. Science in its practical applications will have no difficulty in finding followers; the question of how much money a scientific law or fact will produce is the prime object of the many, but there is a much more exalted side of science, and it is to this side that I invite your attention for a few moments.

I do not mean to depreciate the motives or the usefulness of those who devote their time and energy to the practical utilization of science in our everyday life, but I do mean that there is something higher and nobler than that in science, and that the one who cultivates this side of science has the nobler aim in life. The true scientist is not restricted by the narrow limits of practical utility; his domain is wider and his investigations freer. The discovery of a new law in science can not be measured by money; its influence is exerted on all mankind and lasts forever. In the past century many scientific laws have been discovered, any one of which has done more towards the amelioration of the lot of man than all the alms and charities since the beginning of time.

The practical scientific man is always the follower of his master in theoretical or pure science, and is entirely dependent on the latter for his inventions. There have been given but few inventions to the world that were not based on previous discoveries made by men who neither expected nor cared to make money out of their chosen science. The practical scientist adapts laws to commercial purposes, but he never discovers laws.

One sometimes reads of indexes of civilization and prosperity proposed for various nations. For example, an English writer has said that the civilization of a land might be measured by the amount of sulphuric acid it manufactures. Another has proposed iron, still another soap, as an index, but it strikes me that the civilization and progress of a country may be much more accurately gauged by the amount of attention it pays to pure science. There is no doubt but that Germany stands at the head of all nations in practical science of all kinds, and equally certain is it that no country is so thoroughly impregnated with a pure scientific spirit or is so prolific of men who devote their lives to science in its highest aspects. These are the men who really give to the world those ideas the practical utilization of which has given us our present advancement. These men may be but little known except to students. How many of us, for instance, know even by name Kolbe, Lothar Meyer, Hofmann, Kekule, Wislicenus, or Ostwald? Yet these chemists, by their discoveries, have opened and are now opening vast avenues to trade and commerce and otherwise contributing to the welfare of their fellow-men. These are the real benefactors of mankind, and their example should be emulated by all scientists who have the love of science in their hearts. There is no nobler life than that of a man who devotes himself to science. It is unselfish, it is a search after truth, and it benefits mankind. No higher attributes can be assigned to any other calling.

Very often one is asked what this or that experiment is good for. It is sometimes difficult to make the questioner

[1] Introductory Address, by Dr. Everhart, President of the Academy, Feb. 6, 1892.

comprehend that although there may be no apparent money value in the investigation, still it has a scientific value. The scientist in an investigation rarely thinks of its practical application, yet some of the greatest godsends to the human race have resulted from these theoretical researches. For example, medicine would have no knowledge of chloroform, ether, acetanilide, antipyrin, potassium bromide, and countless other equally valuable preparations, were it not that these substances were discovered during theoretical investigations. Again, when Faraday was working on the bad-smelling, dirty-looking coal-tar, who ordinarily would have supposed that his isolating from this unpromising substance benzine and some of its derivatives would revolutionize many industries and inaugurate others that now have a capitalization of millions and millions of dollars? Faraday's researches rendered possible the coal-tar color industry.

Numberless instances of the practical value of theoretical investigations might be given, but the above will suffice.

There is, perhaps, a popular prejudice against the scientific man. This prejudice was formerly directed against mathematicians only, but is now being extended to other scientists. There is no outcry against them, but their advice and conclusions are often thought inferior to those of the so-called practical man. Unfortunately for the pockets of these people confiding in the judgment of the practical or rule-of-thumb man, their ventures nearly always come to grief. I believe that the amount of money lost in this way, even during the last twenty years, amounts to more than the national debt. This popular idea is due entirely to ignorance and to unfamiliarity with science and scientific men and methods. It is hoped that this Academy of Science will be able, both directly and indirectly, to help educate the people to put their confidence in those that are worthy of it. When this is brought about we will no longer have companies organized to make a Keely motor, nor to refine sugar by electricity, nor will we have men digging for gold in every rock, or looking for bituminous coal in alluvial formations.

I believe that with these aims before us we can make the academy a success and a benefit to science. Texas has ample and first-class material in her young men for the making of future scientists, both pure and practical. We should encourage by every means in our power the study and prosecution of the exact and natural sciences, because, no matter what may be said to the contrary, on them rest our comfort, our welfare, our progress, physically, mentally, morally.

LETTERS TO THE EDITOR.

**** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

The editor will be glad to publish any queries consonant with the character of the journal.

On request in advance, one hundred copies of the number containing his communication will be furnished free to any correspondent.

Causes which Produce Cold, and Mild Periods.

IN *Science* for Aug. 21 and Feb. 19, I pointed out what I conceived to be the cause of the frigid and warm periods. Still, in order to make my views more plain, further explanation, and repeating, may be necessary.

The tropical surface-waters of the ocean when moved into the high latitudes in large volumes, thus adding their warmth to the heat imparted by the sun, are undoubtedly able to cause a mild climate. This is the opinion of most writers on climatic changes. Still, it seems to me, while viewing the subject from a marine standpoint, that they have only partly comprehended the manner in which the ocean waters are moved in a latitudinal direction. Consequently, their explanations have never proved satisfactory to those who have considered the subject. The only way in which tropical waters are moved into the high latitudes, in quantities sufficient to cause a mild climate, is through the force of the great prevailing winds of the globe. These winds, as is well known, blow mostly from the east towards the west in the tropics, and from the west towards the east in the high latitudes. This counter-movement of the winds, in connection with land of great latitudinal extent, like the western continent, is able to move the tropical waters far into the northern and southern seas. But in order to do such work perfectly, the land should extend unbroken from the Arctic to the Antarctic circles; because, under such conditions, the westerly winds would blow the surface-waters of the ocean away from the eastern shores in the high latitudes, and so cause extensive low sea-levels, while the easterly winds of the torrid zone would heap the ocean waters against the tropical shores of the continent. Consequently, the warm waters of the tropical high sea-level would be moved by gravitation to the low sea-levels of the high latitudes, even to the Arctic and Antarctic regions, and thus afford them a mild climate. In this way we account for the mild climates enjoyed by the temperate and polar regions during early ages. For it is probable that during such times the wide channel of comparatively shoal water, which now separates the western continent from the Antarctic shores, was a region of low land, and the channels leading into Baffins Bay and Davis Strait were also closed. But since the Tertiary period the low land that connected Cape Horn with the southern continent has been flowed by the sea; which may have been caused through a tendency of the ocean waters southward, or a comparatively small movement in the earth's crust. This flowed region as now represented increases in depth from its northern and southern shores to 1,000 fathoms in its middle portion. The channel has probably been greatly deepened since its first flowage, through the scouring of ice-sheets for thousands of years of successive ice-periods; and it is owing to its waters separating the Antarctic shores from South America that prevents the strong westerly winds of that region from creating a low sea-level in the high southern latitudes. Therefore, the waters of the torrid zone heaped against the South American coast by the trade-winds are not at this date attracted far into the southern seas. It is true they flow along the coast of Brazil to an inferior low sea-level, caused by the westerly winds blowing the surface-waters away from the coasts of Argentine and Patagonia, but on gaining that region they are met by the cold currents which pass through the channels opening into the Pacific, and so turned away from the more southern latitudes. The westerly winds further south, owing to the Cape Horn channel being open, cause, as I have before explained, a drift current to extend around the southern portion of the globe, which largely turns away all tropical currents setting southward. And it is through this exclusion of tropical waters from the high southern latitudes, ice-sheets have been able to gather and will continue to gather on the southern continent and extend into its shallow seas, until the channel separating the western continent from the Antarctic lands is closed. The closing of this channel with ice is only a question of time should the snowfall of that region continue to be as great as it is now.

The Antarctic ice-sheet may have been over ten thousand years in gaining its present extent and thickness, and it may require as much, or more, time to perfect it. Yet it is probable that the larger portion of its coast-line cannot be extended seaward, on account of the great depth of the ocean bordering its shores. But where the water is comparatively shoal the ice-sheet must advance until all the neighboring shallow seas and channels are filled, and a broad isthmus of ice connects the Antarctic lands with the western continent. This being perfected, the strong westerly winds of the southern latitudes will blow the surface-waters away from the Atlantic side of the isthmus, and so cause an extensive low sea-level sufficient to attract the tropical waters from the high sea levels abreast Brazil and the east coast of Africa well into the southern ocean, and thus cause in time a mild climate in the Antarctic regions, as I have before pointed out.

In the northern latitudes we see the Arctic channels severing the western continent from the more northern lands; and it is